Fig. 4 shows the AMU, atomic mass unit, spectrum for a source of solid phosphorous in an ion beam system using a beam energy of 30 KeV. The spectrum clearly shows a first beam current peak 44 at 31 atomic mass units and a second beam current peak 46 at 62 atomic mass units. This curve clearly shows that when the magnetic analyzer is adjusted to select phosphorous ions having 62 atomic mass units there is ample beam current available.

While the invention has been particularly shown and described with reference to the preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A method of forming source/drain regions, comprising the steps of:

providing a semiconductor integrated circuit wafer having source/drain regions;

providing an ion implant apparatus;

placing a phosphorous ion source in said ion implant apparatus;

adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising P_2^+ ions, wherein said ion beam has a beam density and a beam energy;

implanting P_2^+ ions into said source/drain regions of said integrated circuit wafer using said ion implant beam; and

annealing said integrated circuit wafer having P_2^+ ions implanted at an anneal temperature for an anneal time.

2. The method of claim 1 wherein said adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising P_2^+ ions uses a magnetic analyzer.

3. The method of claim 1 wherein said beam density is between about 4×10^{14} and 6×10^{14} ions/cm^2.

4. The method of claim 1 wherein said beam energy is between about 20 and 48 KeV.

5. The method of claim 1 wherein said anneal temperature is between about 900°C and 1100°C.

6. The method of claim 1 wherein said anneal time is between about 10 and 20 seconds.

7. The method of claim 1 wherein said phosphorous ion source comprises solid phosphorous.

8. A method of forming source/drain regions, comprising the steps of:

providing a semiconductor integrated circuit wafer having source/drain regions;

providing an ion implant apparatus;

placing an arsenic ion source in said ion implant apparatus;

adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising As_2^+ ions, wherein said ion beam has a beam density and a beam energy;

implanting As_2^+ ions into said source/drain regions of said integrated circuit wafer using said ion implant beam; and

annealing said integrated circuit wafer having As_2^+ ions implanted at an anneal temperature for an anneal time.

9. The method of claim 8 wherein said adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising As_2^+ ions uses a magnetic analyzer.

10. The method of claim 8 wherein said beam density is between about 4 X 10^{14} and 6 X 10^{14} ions/cm^2.

11. The method of claim 8 wherein said beam energy is between about 20 and 48 KeV.

12. The method of claim 8 wherein said anneal temperature is between about 900°C and 1100°C.

13. The method of claim 8 wherein said anneal time is between about 10 and 20 seconds.

14. The method of claim 8 wherein said phosphorous ion source comprises solid phosphorous.

~~15~~. A method of doping a polysilicon electrode, comprising the steps of:

providing a semiconductor integrated circuit wafer having a polysilicon electrode formed thereon;

providing an ion implant apparatus;

placing a phosphorous ion source in said ion implant apparatus;

adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising P_2^+ ions, wherein said ion beam has a beam density and a beam energy;

implanting P_2^+ ions into said polysilicon electrode using said ion implant beam; and

annealing said integrated circuit wafer having P_2^+ ions implanted at an anneal temperature for an anneal time.

16. The method of claim 15 wherein said adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising P_2^+ ions uses a magnetic analyzer.

17. The method of claim 15 wherein said beam density is between about 4 X 10^{14} and 6 X 10^{14} ions/cm^2.

18. The method of claim 15 wherein said beam energy is between about 20 and 48 KeV.

19. The method of claim 15 wherein said anneal temperature is between about 900°C and 1100°C.

20. The method of claim 15 wherein said anneal time is between about 10 and 20 seconds.

21. The method of claim 15 wherein said phosphorous ion source comprises solid phosphorous.

22. A method of doping a polysilicon electrode, comprising the steps of:

providing a semiconductor integrated circuit wafer having a polysilicon electrode formed thereon;

providing an ion implant apparatus;

placing a arsenic ion source in said ion implant apparatus;

adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising As_2^+ ions, wherein said ion beam has a beam density and a beam energy;

implanting As_2^+ ions into said polysilicon electrode using said ion implant beam; and

annealing said integrated circuit wafer having As_2^+ ions implanted at an anneal temperature for an anneal time.

23. The method of claim 22 wherein said adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising As_2^+ ions uses a magnetic analyzer.

24. The method of claim 22 wherein said beam density is between about 4×10^{14} and 6×10^{14} ions/cm^2.

25. The method of claim 22 wherein said beam energy is between about 20 and 48 KeV.

26. The method of claim 22 wherein said anneal temperature is between about 900°C and 1100°C.

27. The method of claim 22 wherein said anneal time is between about 10 and 20 seconds.

28. The method of claim 22 wherein said arsenic ion source comprises solid arsenic.